

DIAGNOSTIC AND CONTROL METHODS FOR INTERNALLY CALIBRATED OXYGEN SENSOR

ABSTRACT OF THE DISCLOSURE

A set of methods controls the pumping action of and provides leak checking of a solid electrolyte oxygen sensor having internal and external electrodes. A first method performs a leak check on the sensor by forcing the sensor internal reference chamber to an evacuated state while seeking a minimum pumping current able to maintain this state. Further pumping control methods apply current pulses to the sensor electrodes to achieve a balanced state between an external oxygen partial pressure and an internal reference oxygen partial pressure. Reduction expressions modify the pulse parameters as a function of the sensor voltage output. A further expression modifies the pulse magnitude as a function of the internal reference chamber oxygen partial pressure. A further expression modifies the initial value of the pulse magnitude as a function of the oxygen partial pressure in a calibration gas during a calibration process.